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CAPITAL, INTEREST, AND DIMINISHING  
RETURNS.

SUMMARY.

I. The Ricardian view as a starting-point: advances to laborers, 334.—Are there advances? Clark's view considered, 336.—Do capital goods reproduce themselves, and does their maintenance involve abstinence? Advances to laborers in a complex society, 339.—II. The law of diminishing returns as applied to capital by Carver, 348; by Clark, 350; by Böhm-Bawerk, 352.—Criticism of this view, 353.—Static and dynamic conditions, 356.—The law of diminishing returns and the law of diminishing utility not the same, 360.—Conclusion, 362.

THE debate carried on in the columns of this Journal between Professors Böhm-Bawerk and Clark has raised once again the fundamental questions as to the nature and cause of the return on capital, and its relation to the return for labor.<sup>1</sup> Some phases of these questions I propose still further to consider.

That an increase of capital—the number of laborers and the state of the arts remaining the same—lowers

<sup>1</sup>See the articles by these scholars in the issues for November, 1906, and February, May, and November, 1907. I would add that my own article was completed and put into type before the receipt of that by Professor Veblen in the last issue (February, 1908).

interest and raises wages has been laid down by all economists since the days of Adam Smith and Ricardo. The unsettled problems are as to the mechanism by which these results are brought about, the rate at which the decline in interest takes place, the extent to which capital can continue to increase and still get a return, the conditions on which the past and future of interest depend. There is another problem even more important, and no less unsettled, in the background,—the grounds on which the receipt of interest can be defended as part of the social order. To some of these unsettled problems I propose to give attention.

## I.

I will begin by recalling the older view, as outlined by Ricardo himself, and as stated more explicitly by Mill and other followers. According to this, all the operations of capitalists are resolvable into a succession of advances to laborers. Profits or interest (practically the same thing was meant in the earlier terminology by these words) arose from an excess of what the laborers produced over and above what was turned over to them. As we all know, this mode of treating the problem was associated with the wages-fund doctrine. It is not material to the fundamental proposition here under consideration whether the wages-fund doctrine be rejected *in toto* with contempt or whether some elements of truth in it be admitted. The things which are supposed to be advanced to the laborers may or may not be dubbed a "fund" or "wages-fund"; and they may or may not be conceived as predetermined in amount.<sup>1</sup> The essential things are

<sup>1</sup>These matters I have considered in my volume on *Wages and Capital* (1896). The substantive conclusions there reached I have seen little occasion to change. On one point, however, not unimportant, I should make a modification. The term "wages-fund" ought to be discarded. Possibly a "wages-flow" might be spoken of without causing misconception; but even this is of doubtful serviceableness, since it suggests a flow of wages distinct from the flow of social income in general.

that laborers are assumed to be hired by capitalists, that the existing possessions of the community are supposed to be the property of a limited number of such capitalists, and that the mechanism by which wages are adjusted is a hiring of laborers by these owners, or capitalists.

There is here, obviously, a close resemblance to the "surplus value" version of the Marxian socialists. In that, also, all gains of the capitalist class—whether considered as one homogeneous mass or classified under the heads of interest, rent, business profits, monopoly gains—arise from a surplus. The socialists go further, and say that no part of this surplus has justification. The strict Marxians, too, maintain doctrines as to the abstract relation of "value" to the labor embodied or applied. These corollaries drawn by the socialists do not bring them into inconsistency or difference with the original proposition; namely, that the source of all capitalist gains is an excess of the product of labor over and above what is received by the laborers.

This proposition seems to me sound. A recognition of it, an acceptance of its consequences, and reasoning based upon it seem to me essential to an understanding of the phenomena.

The grounds on which the proposition itself rests are simple. They are, on the one hand, that production takes time, and, on the other hand, that there is inequality of possessions. These are facts so patent that no proof of them can be needed. The time-using character of highly organized production has been repeatedly dwelt on by writers of all schools, and has been especially illustrated and emphasized in the brilliant exposition of Böhm-Bawerk. The inequality of possessions is a great historic fact, doubtless not in accord with ideals of the best human progress, but to be faced as a characteristic

of almost all developed societies, and not least of modern societies. Resting on it is the other great fact, comparatively modern, of the preponderance of hired labor. Inequality has been somewhat mitigated during the last half-century by some accumulations on the part of hired laborers through savings-bank deposits and the like. But these accumulations are still insignificant as compared with those of the possessing classes. Much the greater part of the property in society is owned by the comparatively small number of the latter. Hence it follows that the support and reward of most laborers during the period of production are secured through advances made (*i.e.*, wages paid) to them by the owners of existing wealth. Recurrently, those owners get into their hands the wealth newly produced, and turn part of it over to the laborers again. They steadily retain for themselves a surplus, which is the source of all capitalistic gains.

At least one fundamental assumption in all this has been questioned. It has been maintained, most explicitly by Professor Clark, that there is no such thing as an "advance" by capitalists to laborers. Before proceeding further, it will be well to consider the objections raised by him.

The only advances made, according to Professor Clark, are by the producers of finished articles to the producers of articles not finished. The producers are represented by him as being in groups A, A', A'', A'''. The group A is supposed to turn out raw materials; group A' transforms that raw material somewhat; A'' brings it still nearer completion; A''' finally "produces" finished or consumable commodity. Now, says Professor Clark, there may be an advance by A''' to the other groups, but there is no other advance. "The whole question whether goods are advanced by one class of persons to another,

in order to tide that other class over an interval of waiting, clearly has reference, not to the relation of capitalists in general to laborers in general, but to the relation of certain sub-groups to other sub-groups in the producing series."<sup>1</sup>

Professor Clark here seems to me to confound two essentially different things: on the one hand, the division of labor between different groups of successive producers; on the other hand, the relations of laborers and capitalists to one another in each single group and in all the groups taken as a whole.

The division of labor between different sets of successive producers is a familiar matter. The illustration of the groups A, A', A'', A''' (with the addition, if you please, of other similar groups,—B, B', B'', B''', and so on), fits it perfectly. All this is part of "the roundabout or time-using mode of using labor," to quote Professor Clark himself.<sup>2</sup> But to suppose, as Professor Clark does, that such a time-using process brings also a "synchronizing" of labors and return seems to me quite erroneous. I find myself in complete accord, on this subject, with what has been said by other critics, notably by Professor Carver<sup>3</sup> and more recently by Professor Böhm-Bawerk.<sup>4</sup> What A'' does is to put the finishing touches on work brought nearly to the stages of completion by the previous labor of A, A', A''. If one wishes to use a method

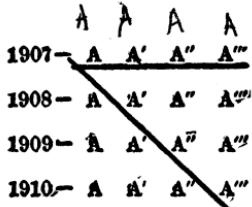
<sup>1</sup> *Distribution of Wealth*, p. 305. I have simplified Professor Clark's illustration by referring only to one series of producers, A, A', A'', A''', as he has himself done at p. 315. The case is the same if there be supposed several series, A, A', A'' . . . , B, B', B'' . . . , C, C', C'' . . . , and finally H, H', H'' . . . ; in which case the A group stands for the successive workers on wheat, flour, and bread, the B group for the workers on wool, cloth, and garments, the C group for those on logs, lumber, houses, and the H group finally for those on ore, iron, tools. This more elaborate supposition is made by Professor Clark at pp. 268, 269.

<sup>2</sup> Page 309.

<sup>3</sup> In his review of *Distribution of Wealth* in this Journal, vol. xv., p. 594.

<sup>4</sup> In this Journal, vol. xxi., p. 266.

of letters and diagrams, the following indicates the actual situation:—



During any one period (say in 1907) all four A's are working simultaneously (say growing wool, erecting spindles and looms, manufacturing cloth, making garments). But the material on which A has worked in 1907 is passed on to A' in 1908. That which A' has partly fashioned is passed on to A'' in 1909. A''' finally gives the finishing touches in 1910. It is not the horizontal line running through 1907 that represents the course of production, but the oblique line that runs through all four periods.<sup>1</sup>

Probably Professor Clark would say, with reference to the above illustration, that it really fits into his own view. He would maintain—I trust I am right in interpreting his reasoning—that, when once the preparatory work of A, A', A'', has been done, it makes no difference which order we consider. Both lines—the horizontal and the oblique—show the same series of A, A', A'', A'''. When once the wool has been grown and is in existence, when once the looms and factories are made and ready for use, it is *as if* the present work of A brought an immediate consumable product in the garments to which A''' is now giving the finishing touches.

But it is not *as if*. There are essential differences. There is not, in fact, any “synchronizing” of production

<sup>1</sup>This mode of representation is used in my *Wages and Capital*, chap. i., p. 23. I repeat it here, as the briefest way of stating my opinion.

or any "instantaneous" clothing of the people. The difference appears perhaps most strikingly in another closely related matter, on which again I must differ with Professor Clark; one, too, which brings into view the whole conception of capital and labor. It is the relation of "abstinence" to the genesis of new capital and the maintenance of existing capital.

Elsewhere in his book Professor Clark maintains that "abstinence *originates* new capital," but that, "once the series of capital-goods is created and set working, there is no further waiting to be done." This is because "the keeping up of the series of capital-goods is, in a sense, automatic. The mill, the ship, virtually replace themselves as they are worn out." "Abstinence is confined to the genesis of true capital; none of it is involved in maintaining an endless series of capital goods."<sup>1</sup>

This seems to me fundamentally untrue. And the insertion by Professor Clark of the qualifying phrases "in a sense" and "virtually" indicates, as Professor Böhm-Bawerk remarks of their use in other parts of the book, an uneasy sense of the inaccuracy.

Turn again to the set A, A', A'', A'''. In what sense can it be said there is abstinence in the maintenance of the sheep and wool, the looms and spindles, on which A and A' are working? Evidently, in this sense: A''' is turning out in each period enough to supply *all* of them, not only A''' himself, but A, A', A''. These workers in the earlier stages might knock off, and during the whole current period not suffer thereby. We may imagine either that A, A', A'', drop their work completely, leaving A''' to continue, as before, with the finishing touches, or that they help A''' on his finishing work, each of the four

<sup>1</sup> I quote from pp. 133, 134, and from the summary of the chapter at p. xviii.

then doing one-quarter of the usual daily stint, and each being thus enabled to loll or play for three-quarters of the time. The group as a whole, in other words, has its choice: it may either enjoy once for all on easy terms in the present or it may continue to work in the present, and so maintain the machinery of production for sustained enjoyment through the future.

This is precisely what "abstinence" or "waiting" must mean, with reference to a stage when laborers are not hired, but own and use their own tools. The first capital must have been made in spare time; that is, in time which did not have to be given to labor for satisfying immediate wants. There is, then, a choice between idleness (or play) and work which provides for the future.<sup>1</sup> That choice recurrently presents itself as tools wear out and materials are used up. The same choice would recurrently present itself to a collectivist or socialistic community. The whole body of socialists might for a time shorten their hours immensely, almost cease working, by simply using up the stocks on hand and doing nothing but put the finishing touches on the things nearly completed. But if they wish to keep their productive apparatus intact, they must refrain from this presumably agreeable relaxation, and work away at their tools and materials.

Of course, when the first irksome steps in the way of abstinence, or waiting, have once been taken, it is *much easier* to keep the process up. The primal savage who

<sup>1</sup> I will not enter on the psychological and anthropological questions whether the very earliest work on tools in fact involved irksomeness and meant a sacrifice. Professor Clark assumes that the original making of capital involves an onerous waiting, and the same assumption has been made by most writers on this subject, including Professor Bohm-Bawerk (see the latter's Positive Theory, Book II., chap. iv.) All this very likely is, in Professor Veblen's phrase, "harmless misinformation" concerning the doings of primeval man. For the purposes of the present discussion its accuracy is not material. The only inquiry here is whether the first making of tools and their later maintenance call for radically different operations; and it is on this point that I must differ with Professor Clark.

figures so commonly in representations of these operations surely finds it much easier to replace his canoe when he has got together, by the use of the first canoe, an abundant store of fish. But, tho it is easier, the irksome thing must still be done. He must work rather than bask in the sun. When tools have once been provided, the process both of getting new capital and of maintaining existing capital becomes progressively easier. Labor becomes more productive; the available inflowing supply of consumable goods becomes larger; and less and less sacrifice of immediate relaxation is entailed in giving part of your labor to keeping up your apparatus or in making new apparatus.

When we leave these supposed simple conditions (of workmen owning and using their own tools) and come to the common situation of modern societies, we have a very different state of things to deal with. The farmer who digs his own drainage ditches "abstains" in the manner of the primal savage. But in the ordinary conditions of our complex societies, abstinence, or waiting, is vicarious, so to speak. It is done not by the workmen themselves, but by others who have present means and have the choice of hiring the workmen either for making things immediately enjoyable or for making tools. Professor Clark puts it thus: "Abstinence consists in taking one's income in the form of producers' goods,—electing to take draft horses instead of driving horses, trading vessels instead of steam-yachts, factories instead of pleasure palaces, always as part of the income of the men who do the abstaining."<sup>1</sup>

This is true and well stated. But it should be supplemented by adding that the election in the end is between *hiring laborers* to do the one thing or the other. Neither trading vessels nor steam-yachts came into the world ready-

<sup>1</sup>Page 134.

made. They are fashioned by labor, and the direction to which the labor is turned rests upon the choice of those who have free income; in other words, on the direction of demand. Freight boats and factories wear out; so do yachts and palaces. Neither sort reproduces itself. Both are made by labor, both can be replaced only by labor. The same abstinence that is involved in the first making of a factory is involved in its remaking.

Take the concrete case of a cotton-mill. The owners know that it will wear out in time. The "life" of the machinery in such a mill is about ten years. At the end of that period it is nothing but scrap-iron. Therefore, the owners put aside every year something for "depreciation"; that is, they do not divide all that they might (say in the form of dividends, if the organization be that of a stock company), but reserve annually so much as will enable them at the end of the ten years to buy another set of machinery. There is nothing to compel them to do so.<sup>1</sup> They may conclude that the business is not likely to be profitable, may wind up the whole thing, and turn over to the stockholders in cash what had been set aside for depreciation. The stockholders then can do as they please. They can reinvest in other directions—that is, cause laborers to be hired in making other capital—or they can "spend" on palaces or yachts; that is, cause laborers to be hired in making things of this sort. The strong probability of course is that the manufacturing corporation will be kept up as a going concern, and that the depreciation fund will be used in buying new machinery to

<sup>1</sup> Professor Clark says (*Distribution of Wealth*, p. 133): "The loom in the factory that is worn out and is about to be replaced has, during its career, earned its share of dividends for the stockholders of the mill, and, besides this, *has earned for them a sum that will buy a new loom*. It is not necessary, therefore, to take the cost of the new loom out of the stockholders' incomes. That would impose on them the necessity for a genuine act of abstinence." The italics here are mine. Is this "earned sum that will buy a new loom" necessarily committed to buying a new loom? *Must* it be reinvested? *Has* not the stockholder precisely the same freedom as to what he will do with this as he has with his other income?

replace the old. In other words, labor will be turned to making the new machinery. But there is nothing automatic in the process, no certainty of replacement, no difference between the mode in which existing capital is replaced and that in which new capital comes into existence.<sup>1</sup>

The substantial difference between Professor Clark's view on this point and my own can perhaps be best indicated by a practical application. Suppose a tax were levied precisely equal to the interest on capital now in existence. Would that capital continue in existence indefinitely? Surely, yes, according to Professor Clark. Existing capital, he says, replaces itself automatically or "virtually." Its replacement, he believes, entails no further abstinence or sacrifice to the owner. Hence he must admit that society could appropriate the whole return without suffering ill results from a diminution of its outfit of capital. To me it seems clear that, since "abstinence" ordinarily entails some degree of sacrifice,—or, to put it in more modern phraseology, since present goods or present income are ordinarily preferred to future goods or future income,—capital would cease to be maintained with the complete disappearance of return on it. This, of course, on the assumption that the régime of private property persists. I will not digress to the consideration of capital and its maintenance in a collectivist society.

The value of a distinction lies in its pointing to propositions which hold good of one of the things distinguished and do not hold good of the other. The particular propositions or conclusions which Professor Clark deduces from his distinction between capital and capital goods seem to me quite untenable,—thus, as to the "synchronizing" of labor and its product, or the replacement of capital

<sup>1</sup>I venture to refer on this whole subject to my *Wages and Capital*, pp. 56–63, 67, 225. The subject seems to me very simple.

without abstinence. There may be other conclusions from this sort of distinction, as to the social merit or justification of returns on "capital goods" as distinguished from returns on "capital." I suspect, however, that the conclusions which might be deduced on such social questions would be very different from those which run through Professor's Clark's writings. They would point not to the same justification for all kinds of "capital" (such of course is the drift of Professor Clark's reasoning), but to a discrimination between "capital" and "capital-goods," and to a still further discrimination between those capital goods which are fashioned by man and those agents which are the free gifts of nature. But these are matters not pertinent to the subject of the present discussion. So far as this is concerned, the distinction between capital and capital goods only beclouds the situation, in no way clarifies it.

Let us return now to the question of advances. As the relation of present labor to past labor, and that of abstinence to the making and replacement of capital, presented themselves in different form according as we considered independent or hired laborers, so does the question of advances to laborers present itself differently.

Consider, first, the case where there are independent laborers only, and no employing capitalists. Professor Clark suggests that in the group A, A', A", A"', the last worker, A"', who puts the finishing touches in the series, may possibly be conceived as supporting the others whose work is in the earlier stages, and as making "advances" to them. I should not myself consider such a phraseology apt. A''' of course turns out all the consumable goods, and is their proximate owner. But he must have had the tools and materials which A, A', A", are making. If, indeed, he is richer than the others, and owns once for all

the whole outfit of tools and materials, he is a possible employer and exploiter. But if he is on a par with them, is simply a worker, putting the finishing touches on the half-made or three-quarter-made things which come into his hands for completion, he turns over to the others a proportional part of the consumable goods. Even if there be no conscious sharing, he must buy tools and materials. He *exchanges* part of his bread (suppose this to be the bread-making group) for flour to be baked into more bread, just as the flour-maker exchanges part of his flour for new grain. There is division of labor and exchange within the group. Each of them owns a part of the capital of the group, each contributes to the output; and each will get (if they compete freely and are equal in endowments) the same share of the output. The group as a whole may perhaps be conceived as recurrently hiring all the laborers in the various stages to keep at their work and to maintain the tools and material as well as turn out the completed goods. A socialist community may be described, if one likes that turn of speech, as so dealing with its members.

All this, however, is idle speculation, or at least analysis of hypothetical conditions very different from those of the actual world. The sort of hypothesis which yields good results in economic reasoning is that which conforms to facts,—which only simplifies the facts and strips them of non-essentials. Let us assume the actual situation in modern societies. Suppose that at each stage there are, not independent laborers, owning their own tools and materials in common or severally, but bare-handed laborers, having little or nothing, and employed by capitalists. This of course is the case (stated baldly) in modern societies.

Here the laborers A—those who grow the wool, to vary the illustration—are hired by capitalists. The laborers

who card and spin and weave in factories are hired by other capitalists, those who make up the cloth into garments by others still. *All* the laborers are dependent for the means of livelihood on the bargain they make with the capitalists. This is as true of those who turn out finished garments as of those who tend sheep and shear the wool. Whether or no the garment-maker can be conceived as "advancing" anything to the others if all are independent workmen, they cannot be so conceived when they have no ownership in what they turn out.

I will not weary the reader with elaboration as to the details by which the dealings of employers and laborers are worked out in a complex society. Of course the laborers first get money. They buy with the money some of the enjoyable commodities to which the last touches are being constantly given in the several groups. They buy, for example, some of the garments turned out by the A''' workers in our supposed group. They do not buy all of the garments, for a portion of the workers turn out clothing for the use of the capitalists and their associates. These last become real interest, profits, rent, just as the laborers' clothing becomes real wages. The capitalists make (*i.e.*, hire laborers to make) and exchange among themselves tools and materials. The replacing of tools and materials goes on systematically. Machinery is manufactured, and flax, wool, cotton, are grown. All this takes place not because there is any automatic reproduction, but because the immense majority of the possessing classes are known to be disposed to keep their accumulations intact, and not to turn their all into palaces and pleasure yachts. Some of the laborers work at consumable commodities which are to be capitalists' income; some at consumable commodities which are to be their own (laborer's) income; some at materials and tools in various stages destined to be in part one kind of income, in part

the other. They are all hired by capitalists, either to keep capital intact or to turn out income.

On one point I agree with Professor Clark. When the consumable commodities get into laborers' hands, they are no longer capital, or at least are no longer producers' capital. And I agree, too, that there is no fixed store of such goods stored up in some limbo. The nearest approach to such a store is in the stocks held by retail dealers,—stocks constantly drawn on and constantly replenished. The source from which wages and all incomes are derived is the inflowing stream of consumable goods. If we wish to use figurative language, we may speak of a wages-flow rather than of a wages-fund, or rather of an income-flow. But the mechanism by which this flow is directed toward hired laborers is that of advances by the capitalist possessors who may do as they please with their own.<sup>1</sup>

## II.

Assuming now that the mechanism of advances by capitalists and production by laborers operates substantially as the Ricardian school conceived it, let us consider some of the possibilities of its operation. More particularly let us consider how far advances by capitalists can be indefinitely increased and a return on capital still be secured. On this subject Professor Clark and some of his critics, such as Professors Böhm-Bawerk and Carver, are very much in accord, at least as to the eventual out-

<sup>1</sup>Needless to say, the question whether consumer's goods should also be dubbed "capital" ("consumer's capital," perhaps) does not enter here. I have simply gone with Professor Clark in his views on this subject, which indeed are also in accord with Böhm-Bawerk's. An enlargement or modification of our conception or definition of capital would not affect the present discussion, tho it would raise other and important questions as to the conditions both of demand and supply for capital in the wider sense. Throughout this article I have confined myself to capital or surplus means used "in production"; admitted on all hands, I believe, to be the dominant use in determining interest for modern communities.

come; whereas it seems to me that a considerable qualification of their conclusions is called for.

Let us follow the Ricardian view one step further. If "capital" (meaning thereby the sum total of things used in advances to laborers) and the number of laborers increase *pari passu*, and if the laborers remain efficient or productive in the same degree, the process of investment and hiring can go on indefinitely. Ricardo had always before him, it is true, the prospect of diminishing returns to labor in agriculture; *i.e.*, less productiveness of labor, and hence lowering of the surplus and of "profits." But even without pressure from diminishing returns the sustained accumulation of capital and the consequent increased advances to laborers might bring about a decline in profits. This result would ensue if capital increased faster than the number of laborers, or—to put the case in its simplest form—if capital increased and the number of laborers remained stationary. More would then be turned over to each laborer, the same amount would be produced for each laborer, and the excess or surplus would diminish. If, indeed, improvements were introduced at the same time with the added accumulations and advances, the decline in profits would be arrested. But the mere fact of accumulation had no connection with improvements and no tendency to bring them about.

Many modern writers, however, including both Clark and his critics, maintain more or less explicitly that there is precisely such a connection. More capital serves *per se* to increase the output. The more abundant the equipment of the laborers with tools, materials, and all the apparatus of production, the more they will produce; and therefore there is no limit to the amount with which they can be profitably supplied.

This view is perhaps most unequivocally stated by Professor Carver:—

The productivity of capital is, like that of land and labor, subject to the principle of marginal productivity, which is, as we have seen, a part of the general law of diminishing returns. Increase the number of instruments of a given kind in any industrial establishment, leaving everything else in the establishment the same as before, and you will probably increase the total product of the establishment somewhat; but you will not increase the product as much as you have the instruments in question. Introduce a few more looms into a cotton factory without increasing the labor or the other forms of machinery, and you will add a certain small amount to the total output. . . . One man with two looms would turn out more per man, but slightly less per loom, because there would be a few more stops. One man with four looms would turn out still more per man, but still less per loom, and so on. . . . That which is true of looms in this particular is also true of plows on a farm, of locomotives on a railway, of floor space in a store, and of every other form of capital used in industry.<sup>1</sup>

The implication is—it would seem even the express statement—that the mere addition of more instruments and tools causes the output to increase. Supply the farmer with more plows, the carpenter with more saws and planes, the weaver with more looms,—then more grain, more wooden ware, more cloths, will be turned out.

I do not believe this to be the fact. Supply the laborers with more tools *of the same kind*, and there is no reason to suppose that the output will increase indefinitely, or even will increase at all. Let the farmer have a second plow, then three, four, a dozen, and he will accomplish no more. The additional equipment will be so much surplusage. Possibly one extra plow, to be turned to in case the first should need repair, will be worth having; but it is a question whether its occasional use (probably rare) will add enough to offset the loss from its own depreciation. Similarly, the addition of more looms will not in itself enable the weaver to turn out more cloth. Where,

<sup>1</sup>Carver's *Distribution of Wealth*, p. 220.

indeed, *new kinds* of power looms are in process of introduction and trial, there is a problem as to how many can be run to advantage by one weaver. A similar problem arises when weavers of a different degree of intelligence and alertness are being tried. The most advantageous adjustment of the labor supply to a given kind of tool or machine settles itself after such a process of experiment. When once it is settled, the mere addition of more tools of the given kind adds nothing. No one would say that a second, third, fourth, hand loom enables a weaver to turn out more cloth. The same is true of power looms or other machinery, when once things have settled down, and when it has been learned how to adjust labor to machinery,—or, to put it in wider terms, how to adjust present labor to past labor.

Professor Clark lays down the same proposition as Professor Carver, and in terms even less qualified.<sup>1</sup> But he adds that the increase in the quantity of capital is accompanied by a change in its character. "Society pulls down its barns and builds others better as well as larger; it carries its mercantile buildings farther into the air, and makes them fire-proof and durable; it substitutes steel ships for wooden ones and steamers for sailing craft; it takes the curves and grades out of its railroads."<sup>2</sup> "Qualitative improvement" takes place with the increase in quantity; in other words, there are tools of a different kind.

Both Professors Clark and Carver deduce a general—nay, a universal—principle of diminishing return. In the clear-cut statement of the latter, every increase of capital, the number of laborers being the same, brings

<sup>1</sup> Professor Clark states it as one of the universal laws of economics. "Supply capital in successive units to a fixed force of laborers, and everywhere you get, as a result, smaller and smaller additions to the output. This is a universal law." *Distribution of Wealth*, p. 50.

<sup>2</sup> *Distribution of Wealth*, p. 184.

an increase of output, but with a diminishing rate of increase. The same doctrine appears in Professor Fetter's *Principles of Economics*.<sup>1</sup>

The readers of this Journal will recall Professor Böhm-Bawerk's criticism.<sup>2</sup> It is that Clark supposes his capital to drop from heaven, so to speak. The same criticism might be directed to Carver's exposition, for in this also capital is spoken of as if it appeared once for all and ready-made. There is no inquiry as to how it comes into existence. Capital must have been made by labor, but there is no consideration of the part played by the labor which made it or of the remuneration got by that labor. Is there a separate product of the capital or only a product of the various sorts of labor which first made the tools and materials and then used them?

The criticism seems to me deserved. In too much of recent economic speculation, capital has been treated as if it were ready-made. I believe that much of the discussion of land and capital, of rent and interest, which runs through the later chapters of Professor Clark's book, and also through the writings of Professor Fetter, rests on a tacit assumption of this sort. Land and capital are treated as if their conditions of supply were the same. "Capital," in the sense in which most of us use that term,—instruments made by man,—involves a sacrifice. In fact, it involves two kinds of sacrifices: labor on the part of the workmen; and "abstinence," or "waiting," or "exchange of present goods for future goods" (which-ever phrase is preferred) on the part of the owners or of those who have hired the laborers. No analysis of capital and interest can probe the problem to the bottom which does not recognize these conditions of supply as to capital. The obvious ear-mark of what we call "land"

<sup>1</sup> Fetter's *Principles*, chap. ix., especially p. 71.

<sup>2</sup> In this Journal, vol. xvi., p. 252, *seq.*

is, on the other hand, that its conditions of supply are fixed by nature. Hence I agree with Böhm-Bawerk in finding a serious gap in Clark's reasoning. He fails to inquire how capital came into existence, and what is the function, what the source of reward, of the labor that made the capital. And this defect obviously is due to his peculiar doctrine as to the automatic reproduction of capital. If tools, materials, goods in process, "virtually" reproduce themselves, there is no occasion for asking whether and how they came to be made by labor.

But, notwithstanding this important difference, the final result reached by the contending debaters is, after all, very similar, and Professor Böhm-Bawerk's concluding thesis is open to the same criticism as that of Clark and Carver. Böhm-Bawerk's doctrine, it will be recalled, is that, as labor is applied in a different way,—as it is spread over more and more time, with more elaborate steps in previous making of tools and plant, with further and further postponement of the attainment of an enjoyable product,—the final output becomes greater. And there is, in his view also, a tendency to diminishing returns. The longer in time the process is, the greater will be the eventual output of consumable goods. Each extension, however, leads to a less increase than the previous extension. The increase in output due to the last extension determines the return to capital in the way of interest. As this extension in time involves a further postponement of present enjoyment, or a further exchange of present goods for future, it will not take place unless there are eventually more of present goods. The theory of the invariable attractiveness of present goods over future has more than a family resemblance to the old doctrine that "abstinence," or "waiting," is something irksome; while the doctrine of the invariable gain from using present goods as a means of spreading labor

advantageously over time, has again a resemblance to the doctrine of a "productivity" of capital.

Thus, while Böhm-Bawerk's analysis follows the process more faithfully in its details, its outcome is the same. The marginal increase in the productivity of labor spread over time, and the marginal productivity of capital,—these seem to me to come to the same thing in the end. There is agreement as to a far-reaching tendency to diminishing yield, and agreement that the marginal yield settles the rate of return on capital.

My own view is that in its historical significance, whether we look backward or try to look forward, this generalized statement is far too sweeping. More particularly, I believe that the theorem of a general tendency to diminishing return as more capital is used—*i.e.*, as more advances are made to laborers—cannot be maintained.

Taking a cross-section of industry at any given period, I should admit that the marginal "productivity" of capital determined the rate of return on it. Imagine that a community, now in possession of a stock of tools and materials, is compelled to part by successive steps with instalments of this capital. Clearly, it would first relinquish those parts which contributed least to the efficiency of labor, and then, as more and more had to be given up, would relinquish others in the inverse order of their serviceableness. It would reserve to the very last those constituents of capital—that is, those ways of roundabout production—which added most to the efficiency of labor. These ways—the last to be given up, the first to be used, if the community possessed its present knowledge of the arts,—would doubtless be, on the one hand, the agricultural operations which, in the temperate zone, run through the seasons and require something like a year's supply of food materials; and,

on the other hand, the metallurgical processes which yield iron, the prime tool of civilization. And, conversely, such a society, supplied in succession with the means of getting back its present stock of tools and materials, would acquire (*i.e.*, would make with the labor that was available) first the more essential, and then, one after another, those less effective in adding to the productiveness of labor.<sup>1</sup>

The gain, or premium, or interest, which will be secured by the owners of the capital in any such supposed stage, will be determined by the least effective or helpful use; or, to use the accurate Böhm-Bawerkian phraseology, by the addition to the enjoyable product of labor which results from the least effective phase of the roundabout or capitalistic process. Those who use capital in the more effective ways cannot permanently retain the superior gain for themselves. All who have capital at command, or the means of getting it made, could turn to the more effective ways. Competition among them will prevent any one set of persons from securing higher gains than the rest. Hence it is the effectiveness of the least productive utilization of surplus possessions (*i.e.*, of capital) which determines the rate of gain for all capital.

But all this marshalling of capital is in the way of cross-section. It arranges the constituent parts of existing capital, as we now know about them, in an order of usefulness. But this order of usefulness is not necessarily, or even probably, the historical order. It would indeed have been the historical order if men had started at the outset with all the knowledge of the arts which they now have. But there is no reason, in my opinion, for supposing that in the past the more effective uses were first turned to, nor that in the future less and less effective

<sup>1</sup>This is the sort of case assumed by Professor Marshall, *Principles of Economics*, Book VI., chap. i., § 9, p. 590 (4th edition), § 8, p. 520 (5th edition).

uses will be turned to. Whether we look backward or forward, no general or certain tendency to diminishing returns can be made out.

Let me illustrate my meaning by a consideration of what has happened in the civilized world during the last century or two, say since the middle of the eighteenth century. Suppose there had been during this period, so far as the bettering of capital goes, strictly "static" conditions. Suppose there had been none of the inventions which brought about the industrial revolution and made the modern world,—no steam-engine, no textile machinery, no railways, no steamships, no new iron and steel making processes. Assume, on the other hand, that accumulation had gone on during this long period at the rate which, in fact, has prevailed,—savings and surplus means valued by thousands of millions. Assume that the only thing which could have been done with this enormous mass of surplus means, in the way of bringing into existence more capital ("capital-goods"), had been an increase in the supply of instruments such as were familiar in 1750,—more spinning-wheels, more hand-loom, more broad-wheeled wagons and stage-coaches, more wooden sailing-vessels. Is it not obvious that before long the multiplication of these things would have led to no further gain? The persons who had the large surplus means, and who invested them in hiring laborers to make more and more of the old-fashioned tools, would have been brought very soon to the stage of no further increase in productiveness, of rapid decline in the rate of interest, and, if they persisted willy-nilly in accumulating and investing, complete disappearance of any return at all on their investments. The mode in which these consequences have been staved off is also obvious: it has been by the march of improvement and invention, the discovery of ways of applying labor to making more

elaborate tools than before, to ways of getting eventually a larger product in proportion to the total labor applied. These newly discovered ways have not been less effective than those previously followed. They have been probably more effective. The steam-engine and the railway—to mention two great transforming agents—stand for increasing returns, not diminishing returns.

But it will be said that I am confounding static and dynamic conditions. The proposition as to diminishing returns from an increase of capital, it will be said, holds good only in a static state, whereas during the last one hundred and fifty years the civilized world has been under highly dynamic conditions.

I confess not to be certain as to what is meant by a static state, and suspect that confusion between "static" and "dynamic" conditions appears among those whose reasoning rests on the supposed distinction. Thus Professor Clark speaks of going through an "illustrative dynamic process," and observes that the process by which capital changes its form, as more or less of it is added, "is not a static process."<sup>1</sup> It is not material what phrases are used. It is material only to keep clear just what is the way in which more capital is supposed to be added, and what is the sort of "natural" change that takes place as this is done. Elsewhere Professor Clark says that "every increase of capital shows itself primarily *in transmuting poor appliances into better ones.*"<sup>2</sup> This seems to me essentially a "dynamic" operation. It is an operation which is assumed by Professor Clark to take place in a "natural" or necessary way, following from the mere presence of more available means,—of more possibilities of making capital. The substitution of steel ships for wooden ones, of power machinery for hand tools, and sundry other improvements, are referred to by him as

<sup>1</sup> *Distribution of Wealth*, p. 178.

<sup>2</sup> *Ibid.*, p. 183.

taking place simply with the greater abundance of capital. But, in fact, they result not merely from that abundance, but from the irregular march of invention and discovery. To quote another passage,<sup>1</sup> "As capital grows more abundant, . . . society also makes all its machinery as nearly automatic as it can, so that one laborer's guidance shall keep much machinery in motion." "Society," I submit, does nothing of the kind. Individual schemers and inventors are trying to find out how to achieve such results. They may or may not succeed. If they do succeed, they may or may not need more "capital"; *i.e.*, may or may not call for a greater preparatory application of labor in making the automatic machinery.

The "static" state, if we are to use that phrase, means a condition in which the arts are stationary. An increase of capital, in such a state, means an addition of tools and materials of the same kind that were used before. By supposing such a situation, we can reason with some clearness as to what would happen if there were simply an increase of capital, and nothing more. We isolate that factor hypothetically, after the familiar practice of deductive reasoning in economics. I have already stated my belief that in such a static state the mere duplication of instruments of the same kind would lead to practically no increase in productivity. This much indeed is implied in Professor's Clark's supposition that with the changes in quantity of capital there are also changes in quality. The changes in quality would not need to be assumed if mere addition of quantity brought an indefinitely continuing gain. The essential point on which I differ is as to the regularity or predictableness of the changes in quality. These changes seem to me, in fact, very variable and subject to no certain law.

In Professor Böhm-Bawerk's treatment of this subject

<sup>1</sup> *Distribution of Wealth*, p. 184.

the form of statement is more guarded. The greater efficiency of the roundabout process is said to be a fact of general experience, very possibly subject to exceptions. Similarly, the tendency to diminishing returns as to the process becomes more roundabout, is set forth not as a "natural" law, but again as an empirical fact. Yet in the later development of his reasoning the acute Viennese thinker seems to me to forget the nature of the premises from which he starts. All his ingenious numerical illustrations (which remind one of Ricardo's illustrative figures) are worked out on the assumption of an increase of efficiency that goes on steadily, yet at a diminishing rate. This may be done, very properly, for the purpose of precision in the hypothetical reasoning, just as Professor Clark's figures may be justified as precise statements of a hypothesis. But Professor Böhm-Bawerk, not less than Professor Clark, draws substantive conclusions of importance. Interest, the former says, *must* appear; for there is always the possibility of using present goods as a means of extending the production period.<sup>1</sup> In other words, no matter how great the accumulation of a general subsistence fund, or, in less technical terms, no matter how great the volume of means pressing for investment, a return in the way of interest can always be secured. Stated in such unqualified terms, the proposition seems to me untenable.

Let me say something more as to the possibilities of an increasing use of capital. To prove that those possibilities are indefinitely extensible, reference is made to the many unused opportunities for applying capital which lie about on every side. There are, it is said, known and perfected devices, as yet only in partial use, to which new accumulations can be directed with clear advantage.

<sup>1</sup> *Positive Theory*, p. 333. See also pp. 377-378, and Chapters I., II., III., of Book VII., *passim*.

Here is a field virtually unlimited, tho one in which further exploitation must face the probability of diminishing returns.

Much of this is true of such a highly "dynamic" state as the world is now in. Inventions and improvements are not adopted by all producers at one fell swoop. They make their way step by step, first adopted by one person then by another, and come into use over the whole field by a gradual process. Professor Clark has effectively pointed out that a characteristic source of employer's profits is in the shrewd appreciation and early adoption of improvements. During the period when they are in process of adoption, very likely a long period, there are these visible and certain ways of applying new accumulations to advantage. If there be a succession of improvements, each new one opens such a vista, and at every instant of time there are unused opportunities for productive investment. Precisely this is what we have seen during the last one hundred and fifty years. We are living in the midst of the greatest burst of invention the world has ever known, one, too, which shows no signs of subsiding. So far as we can see into the future,—that is, for a generation or thereabouts,—there is no indication of any relaxation of the advance in the arts. It may be, as the more optimistic predict, that we are only on the threshold of further great conquests of natural forces. These conquests during the last century have involved more and more plant, and thus have involved more capital. They seem likely to do so for the immediate future, tho in what degree and with what certainty or regularity we are quite unable to say.

But these, after all, are the incidents of a period of transition. If we conceive the transition to be completed,—the current improvements to be applied universally,—then we reach the stage at which we can judge whether

there are unlimited opportunities for investment, unlimited possibilities of increasing the product, merely by adding more instruments of the kind already in use. Then we have the "static" state, and the naked question whether mere increase in the increments of capital (Clark's phrase) or mere extension of the production period (Böhm-Bawerk's phrase) serves to add to the output. To that question the answer, it seems to me, should be in the negative: whereas the question as to what may happen in the dynamic state—when there are "qualitative" improvements or advances in the arts—is not susceptible of such clear-cut answer as both thinkers seem to suppose.

One sort of limitation of the possibilities of using capital must not be overlooked. There are obstacles to the spread and utilization of known improvements which make many of them practically unavailable for great parts of mankind. The use of modern agricultural machinery by the peasants of British India would greatly increase the productiveness of their labor. Were they able to use it well, they could afford to pay handsome interest to those providing it. But lack of intelligence and education, all the rooted conditions of a primitive social state, make this application of capital out of the question. The American traveller in many parts of Europe sees unbounded opportunities for using labor-saving appliances. But, so long as the people are not ready to turn to them, there is here no opening for investment. A change in the intelligence and skill of a great mass of mankind is as much a "dynamic" operation as is the invention of a new mechanical process.

One other aspect of this supposedly far-reaching law of diminishing returns deserves attention. It is sometimes spoken of as if it were but a phase or application

of the general theory of value. Successive increments of any one commodity have diminishing utility and declining exchange value. Diminishing returns on capital are supposed to result directly from the diminishing utility of commodities, the first-named principle being simply the result or manifestation of the second-named.<sup>1</sup>

These two tendencies, or laws, seem to me entirely different. In the one case we have to deal with the utilities and the values of the several units of quantity: in the other we have to deal with those units of quantity themselves,—with physical units. The law of diminishing returns as to land, so often referred to as the type and proof of the wider theorem, neither says nor implies anything as to utilities or as to value. It says only that more and more labor (capital also, if you choose to think of capital as something different from labor) applied to a given area does not remain continuously productive at the same rate; and the productiveness of the several doses is measured in terms of bushels of wheat or tons of hay, not in terms of value. Measured in terms of value, it is by no means necessarily true that there is any tendency to diminishing returns as to land. The smaller quantity of wheat or hay which accrues from the last dose of labor on the land will very likely have not less value, but the same value as preceding products of the same labor. Similarly, the problem as to the increase of return due to added doses of capital is one of quantity. Will more wheat, more cloth, more shoes, be got by making and using more tools or more elaborate tools? The law of diminishing utility, on the other hand, bears on the utilities or satisfactions derived from added units of the same commodity, and so on the *relative* value of the several

<sup>1</sup>“Diminishing returns of indirect agents is a special case of the diminishing utility of goods.” Fetter’s *Principles of Economics*, p. 71. Professor Clark does not seem to hold this opinion; for in his recently published *Essentials of Economic Theory* (p. 56) he refers to the one law as parallel to the other, not identical with it.

products. It thus affects the distribution of labor and capital towards the making of more or less of each product. The one principle has to do with the relative value of different commodities and with the income of satisfactions ("psychic" income) which mankind gets from its exertions. The other has to do with gains in physical quantities, and with the variations in such gains—whether at an increasing, a decreasing, or a stationary rate—from different ways of applying labor.

Returning now to the question as to the law of diminishing returns for successive increase of capital, I may sum up my conclusion by saying that the view which maintains this law seems to me essentially historical, and in that sense unreal. Successive increases of instruments of *the same kind* lead to no increase of return: they bring mere surplusage. The addition of instruments of a different and better kind—what Professor Clark calls qualitative increase—obeys no law. It is dependent on the progress of invention, and its course is irregular and unpredictable. If we have a steady increase of capital of the first kind,—quantitative only,—the return to capital will soon disappear. If we have a steady increase of the qualitative kind, there is no telling whether the addition to the total output, and so the return in the way of interest, will be at a steady rate, an increasing rate, or a diminishing rate.

The mind of man strives for generalization. It seeks to arrange phenomena in law or regular sequence. To this striving, I suspect, is due the attempt to formulate a universal law of diminishing returns. The attempt is like that to reach sweeping generalizations in history or politics, or—to come closer to the sphere of economics—that to find far-reaching or universal laws of economic development. In fact, the phenomena are not susceptible

of such clear-cut generalization; or at least we do not know enough about them to perceive clearly any underlying general forces. We must content ourselves with learning as much as we can of the irregular forces and the puzzling facts, and with stating our conclusions often in hypothetical terms. *If* an increase of capital (or a spreading of labor over more time) always brings a greater output, interest will continue, however great the increase of capital. *If* such an increase always brings a greater output, but at a diminishing rate, interest, while it will continue, will tend to be lower and lower in rate. *If* an increase of capital brings no greater output at all, and if none the less it takes place regardless of consequences, it will lead infallibly to the complete disappearance of interest. In some such forms as these we can state conclusions with sharpness of outline. But just in what way the increase of capital will in fact take place,—what will be the march of invention and discovery,—on this we are not able to forecast the future or the working of the productive forces in the future.

F. W. TAUSSIG.